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ABSTRACT

The purpose of this study was to examine the degree to which agricultural education research has adhered to a structured approach over the past decade. Specifically, the study sought to determine the types of research conducted in agricultural education, the extent to which researchers used conceptual and theoretical frameworks, the extent to which conclusions addressed conceptual and/or theoretical frameworks, and to assess how the formation and use of conceptual and theoretical frameworks had changed over the past decade. The researchers evaluated all research articles published in the "Journal of Agricultural Education" from 1990 through 1999, using a researcher-developed instrument. Findings revealed that the majority of the research conducted in agricultural education over the past decade had been quantitative, applied, survey research. Only 29% of the articles reviewed cited an appropriate theoretical framework, however a vast majority (87.1%) cited an appropriate and clear conceptual framework. Researchers cited a limited number of references in establishing conceptual and theoretical frameworks, and often failed to relate their findings back to those frameworks. Selection and use of theoretical frameworks improved from that which was published in the first part of the decade, although the number of studies with appropriate frameworks was still low. Articles accepted to the Journal exhibited less well-developed conceptual frameworks as the decade progressed. It was noted that agricultural education researchers should adopt and use more rigorous research techniques. (Contains 24 references.) (Author/MM)

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STRUCTURING AGRICULTURAL EDUCATION RESEARCH USING CONCEPTUAL AND THEORETICAL FRAMEWORKS

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STRUCTURING AGRICULTURAL EDUCATION RESEARCH USING CONCEPTUAL AND THEORETICAL FRAMEWORKS

Abstract

The purpose of this study was to examine the degree to which agricultural education research has adhered to a structured approach over the past decade. Specifically, the study sought to determine the types of research conducted in agricultural education, the extent to which researchers used conceptual and theoretical frameworks, the extent to which conclusions addressed conceptual and/or theoretical frameworks, and to assess how the formation and use of conceptual and theoretical frameworks had changed over the past decade. The researchers evaluated all research articles published in the *Journal of Agricultural Education* from 1990 through 1999, using a researcher-developed instrument.

Findings revealed that the majority of the research conducted in agricultural education over the past decade had been quantitative, applied, survey research. Only 29% of the articles reviewed cited an appropriate theoretical framework, however a vast majority (87.1%) cited an appropriate and clear conceptual framework. Researchers cited a limited number of references in establishing conceptual and theoretical frameworks, and often failed to relate their findings back to those frameworks. Selection and use of theoretical frameworks improved from that which was published in the first part of the decade, although the number of studies with appropriate frameworks was still low. Articles accepted to the Journal exhibited less well-developed conceptual frameworks as the decade progressed. It was noted that agricultural education researchers should adopt and use more rigorous research techniques.

Introduction/Theoretical Framework

The future of agricultural education depends upon many variables, not the least important of which is the acquisition and application of new knowledge generated from research. However, the quality of research in agricultural education has often been questioned. Throughout the past two decades it has been criticized as being without focus, of limited scholarship and/or importance, and considered by some to be inferior to research conducted in other disciplines (Buriak & Shinn, 1993; Radhakrisna & Xu, 1997; Silva-Guerrero & Sutphin, 1990; Warmbrod, 1986). Buriak and Shinn (1989) reported agricultural education research to be perceived by external decision makers (i.e., Deans of Education, Deans of Resident Instruction in Agriculture, Experiment Station Directors) as "soft," without clearly defined objectives, and lacking in rigor. Furthermore, Buriak and Shinn (1993) reported internal perceptions to be similar to those of the earlier study involving external decision makers.

The perceived orientation of agricultural educational professionals appears to be toward teaching and service rather than research (Buriak & Shinn, 1989). Newcomb (1990) noted that in many cases university faculty prefer to teach, advise, design curricula, and work with people – only conducting research to the extent necessary "to get by" (p. 2). Newcomb suggested that research in agricultural education become more focused, coordinated, and conducted with a "passionate vision" (p. 8). Crunkilton (1988) suggested that a framework be developed to show researchers where they have been, and where they can and should go.

The theoretical framework for this analysis of research lies in Dewey's Steps in Reflective Thinking, better known as the scientific method (Newcomb, McCracken, & Warmbrod, 1993), as adapted by Ary, Jacobs, and Razavieh (1996). Ary, et al. proposed that there is a "method" of inquiry to which all researchers should adhere in investigating phenomena of interest. Likewise, Lincoln and Guba (1985) noted that even naturalistic studies have a "pattern of flow" that "builds upon...tacit knowledge" and "propositional knowledge," and "uses methods appropriate to humanly implemented inquiry" (p. 187).

Ary, et al. (1996) further proposed that in addition to the accepted steps of the scientific method, research should also be evaluated based upon the assumptions made by scientists, attitudes of scientists in controlling for bias, and formulation of scientific theory. Adapted to this study, this framework suggests that there are models to which all agricultural education research can and should adhere. Specifically, the models encompass a structure by which all research should be based upon philosophy, purpose, and method, and grounded in both a conceptual and theoretical framework – either in its inception or conclusion.

Miller (1998) cautioned that researchers need to be "green and growing" (p. 1) and therefore continue to refine their research skills, much as a mechanic would hone his or her skills. To do so means that researchers should devote time to maintaining and/or improving skills – to re-focus their attention to minor details that often are overlooked as research techniques approach automatic skill transfer status. This study seeks to determine the extent to which researchers in agricultural education are using those skills to conduct scholarly research.

Purpose/Research Questions

Buriak and Shinn (1993) noted that human beings are set apart by their ability to solve problems – to conduct research. Ary, et al. (1996) emphasized the need to follow a systematic procedure in conducting this research. How well does agricultural education research follow a specified procedure? The purpose of this study was to examine the degree to which agricultural education research has adhered to a structured approach over the past decade. The study was guided by the following research questions:

1. What types of research have been conducted in agricultural education?
2. To what extent did researchers use conceptual and theoretical frameworks?
3. To what extent did the conclusions address the conceptual and/or theoretical frameworks used (or produce theory if qualitative by philosophy)?
4. How has the formation and usage of conceptual and theoretical frameworks in agricultural education research changed over the past decade?

Methods/Procedures

Research conducted and reported in the Journal of Agricultural Education over the past decade was reviewed by the researchers and classified as to philosophy (quantitative or qualitative), purpose (basic, applied, or action), and the types of methods employed. Articles were also evaluated for their effective use of conceptual and theoretical structures. The Journal of Agricultural Education was selected because it is the premier refereed outlet for current published research in agricultural education.

The researchers evaluated all research articles published in the 40 volumes of the Journal of Agricultural Education published during the 10-year period from 1990 through 1999. Articles were evaluated using an instrument developed by the researchers. Content validity of the instrument was established by a panel of six land grant university faculty in agricultural education. Inter-rater reliability on the instrument was established at $\underline{r} = .99$.

Journal articles were coded and reviewed for the following components:

- Extent to which the researcher(s) developed a conceptual framework
- Extent to which the researcher(s) developed a theoretical framework
- Extent to which theory was generated (if research was qualitative by philosophy)
- Number of citations used to establish the conceptual framework
- Number of references cited
- Number of research references cited
- Extent to which the researcher(s) used citations to tie conclusions to the literature base
- Type of research by philosophy, purpose, and method used

Data were analyzed using descriptive statistics, including measures of central tendency and dispersion.

Philosophy of Research

According to Gall, Borg, and Gall (1996), researchers have different epistemological assumptions about the nature of scientific knowledge and how to acquire it. As a result of these differences, research is categorized into two groupings based upon the *philosophy* of the researcher. Those two categories are positivistic (quantitative research) and post-positivistic (qualitative research). Quantitative researchers collect numerical data on observable behavior and analyze that data using numerical analysis. Qualitative researchers, on the other hand, believe that research is best constructed as interpretations by individuals and that these interpretations are transitory, situational, and analytically inductive (Gall, et al.).

Wardlow (1989) classified research based upon philosophy into three categories: positivistic mode, interpretive mode, and critical science mode. The positivistic mode in Wardlow's classification corresponds to the quantitative grouping, whereas the interpretive and critical science modes correspond to the qualitative classification used by Gall, Borg, and Gall (1996).

Purpose of Research

In addition to distinction based upon the philosophy of the researcher, studies can also be classified by type based upon the *purpose* for which the research was done. Whereas different names are used to describe these groupings, the operational terms used in this study are "basic," "applied," and "action" research (Ary, et al., 1996).

Basic research is that research conducted in an original area of inquiry, to generate new knowledge, or for the formulation of theory. The primary concern of this type of research is the discovery of knowledge for the sake of knowledge (Ary, et al., 1996). Ary, et al. defined basic research as having the aim of expanding "the frontiers of knowledge without regard to practical application" (p. 26). For example, Piaget's initial work and genesis of his theory of intellectual

development was basic research (Kolb, 1984). Rosenshine and Furst offered another often-cited example of basic research in their Principles of Learning (Rosenshine & Furst, 1971).

Whereas basic research generates new knowledge, most educational research is conducted to test or expand that knowledge. This type of research, "applied," expands upon existing theory and aims to solve specific problems. Whenever theories are generated, research either confirms or rejects the accuracy of those theories as they relate to particular variables under study. As may be surmised from Rosenshine and Furst's Principles of Learning (Rosenshine & Furst, 1971), there is not always a distinguishing line between basic and applied research. While there is currently a trend to merge the two, that union has not yet occurred. For this study the two are treated as separate entities.

Action research is defined by Leedy (1997) as "a type of applied research that focuses on finding a solution to a local problem in a local setting" (p. 111), has specific application, and involves the decision-maker in conducting the research. For example, testing the effectiveness of a recruitment activity for the purpose of improving student recruitment in a college of agriculture is action research.

Research Method

Research is further categorized based upon the method employed to conduct the study. Whereas several classification systems are in place (Ary, et al., 1996; Gall, et al., 1996; Isaac & Michael, 1990; Leedy, 1997; Van Dalen & Meyer, 1979), for the purpose of this analysis methods have been categorized into eight groups: Holistic (qualitative), Historical, Survey, Correlational, Ex post facto (Causal-comparative), Experimental (includes Pre-experimental, Quasi-experimental, True Experimental), Delphi, Evaluation.

Conceptual versus Theoretical Frameworks

Several researchers have advocated the use of strong conceptual and/or theoretical bases in agricultural education research (Buriak & Shinn, 1989; Lee, 1985; Silva-Guerrero & Sutphin, 1990; Wardlow, 1989; Williams, 1997). However, the two terms – "conceptual framework" and "theoretical framework" – are likely the two most misunderstood and misused terms in agricultural education research today. As such, the two terms are often erroneously interchanged.

A conceptual framework builds a structure or "concept" of what has been learned in a particular area of study. Conceptual frameworks are similar to a standard literature review in that the conceptual framework lists the important research that has been conducted in a particular area. It goes beyond a simple literature review, however, in that it truly builds a "framework" of research. That is, it structures the literature in such a manner as dictated by the researcher to best explain the natural progression of research for the phenomenon under study (Ary, et al., 1996).

By contrast, a theoretical framework is a framework for explanations about the phenomenon being investigated (Gall, et al., 1996). The theory itself is defined by Gall, et al. as "an explanation of a certain set of observed phenomena in terms of a system of constructs and laws that relate these constructs to each other" (p. 8). Piaget's theory of intellectual development is an

example of a theoretical framework. It has shaped educational curricula and formed a basis for multitudes of studies to better understand and utilize the theory. Other examples include Fishbein and Azjen's theory of attitudinal influence (Fishbein & Ajzen, 1975) , Vroom's expectancy theory of human motivation (Vroom, 1964), Rosenshine's explicit teaching model (Rosenshine, 1986), Mitzel's model for the study of classroom teaching (Duncan & Biddle, 1974), and Witkin's theory of cognitive styles (Witkin, 1973).

Results/Findings

Question 1: *What types of research have been conducted in agricultural education?*

Most of the research conducted in agricultural education over the past decade has been quantitative, applied, survey research. As noted in Table 1, of the 348 articles evaluated, 290 (83.3%) were classified as quantitative research. Only 12.1% of the research conducted and published in the Journal of Agricultural Education over the past decade was determined to be qualitative. The remaining 4.6% of the studies used a combination of a quantitative and qualitative design.

Table 1
Classification of Research by Philosophy, Purpose, and Method

			No. of Citations		No. of References	
Type of Research	f	%	Conceptual-Theoretical Framework M	Conclusions M	Cited in Reference Section M	Research Based M
Philosophy						
Quantitative	290	83.3	14.38 (7.90)	2.53 (3.48)	14.81 (6.13)	6.69 (4.55)
Qualitative	42	12.1	8.45 (7.27)	.76 (1.38)	18.88 (11.32)	9.36 (13.17)
Both Types	16	4.6	10.06 (5.48)	1.13 (1.89)	11.88 (4.21)	4.06 (3.07)
Purpose						
Basic	10	2.9	7.10 (6.71)	.30 (.67)	15.20 (6.88)	4.10 (3.21)
Applied	315	90.5	13.51 (7.98)	2.22 (3.25)	15.13 (7.11)	6.94 (6.40)
Action	23	6.6	15.70 (7.41)	3.48 (4.07)	15.65 (6.29)	7.43 (5.20)
Method						
Survey	189	54.3	13.58 (8.03)	2.06 (2.94)	13.64 (5.89)	6.07 (4.08)
Correlational	58	16.7	16.14 (8.06)	3.84 (3.77)	16.52 (5.68)	7.41 (4.62)
Historical	14	4.0	5.36 (4.27)	.36 (.84)	23.57 (14.01)	14.00 (18.61)
Experimental	35	10.1	14.69 (6.52)	2.09 (3.34)	17.29 (6.14)	7.40 (4.63)
Holistic	19	5.5	9.42 (7.46)	1.00 (1.41)	16.84 (10.08)	7.16 (9.86)
Evaluation	5	1.4	10.00 (7.87)	5.00 (7.91)	12.00 (12.27)	7.60 (12.03)
Delphi	13	3.7	9.15 (3.63)	.62 (1.66)	12.69 (3.40)	12.69 (3.40)
Ex Post Facto	15	4.3	16.53 (8.89)	2.73 (4.67)	17.40 (5.57)	9.33 (6.25)
Totals	348	100.0	13.47 (7.99)	2.25 (3.29)	15.16 (7.03)	6.89 (6.27)

Note. Standard deviations are in parentheses.

When categorized by the purpose of the research, 315 articles (90.5%) were determined to be applied research, 23 (6.6%) were action research, and the remaining 10 articles (2.9%) were basic research. When classified as to the method employed to conduct the research, 189 studies (54.3%) used a survey method. Correlational studies accounted for 58 articles (16.7%), followed by Experimental (n = 35, 10.1%), Holistic (n = 19, 5.5%), Ex post facto (n = 15, 4.3%), Historical (n = 14, 4.0%), Delphi (n = 13, 3.7%), and Evaluation (n = 5, 1.4%).

Question 2: *To what extent did researchers use conceptual and theoretical frameworks?*

As indicated in Table 2, a vast majority of the articles reviewed (87.1%) cited an appropriate and clear conceptual framework. Only nine of the accepted articles (2.6%) had no conceptual framework. The remaining 36 articles (10.3%) displayed an attempt at creating a conceptual framework, but the review of literature was deemed so weak that a clear conceptual framework could not be discerned.

Only 29% of the articles cited an appropriate theoretical framework. The remaining articles either failed to develop a framework (50%), or attempted to establish a framework, but the result was unclear (21%).

Table 2
Extent to Which Conceptual and Theoretical Frameworks Were Established

Degree to Which Established	Conceptual Framework		Theoretical Framework	
	f	%	f	%
None	9	2.6	174	50.0
Attempted to establish, but result was unclear	36	10.3	73	21.0
Cited and developed appropriate framework	303	87.1	101	29.0
Totals	348	100	348	100

A larger percentage of quantitative studies (89%) than qualitative studies (76.2%) exhibited an appropriate conceptual framework organized the existing research base (Table 3). Four of the nine studies lacking a conceptual framework were applied research – the type of research that necessitates building upon an existing research base.

Both qualitative and quantitative studies failed to develop adequate theoretical frameworks. Only 19.1% of the qualitative studies, and 31.7% of the quantitative studies cited and developed adequate theoretical frameworks. It should be noted that according to Lincoln and Guba (1985), post-positivistic research often generates theory rather than requiring that a study be built around existing theory. However, only eight of the 42 qualitative articles either cited an adequate theoretical framework or generated appropriate theory as stated by Lincoln and Guba. Likewise, only 92 of the 290 quantitative articles either cited an adequate theoretical framework, or properly developed the study around existing theory.

Basic research articles were more frequently missing a theoretical framework than were either applied or action research. This is to be expected since a function of basic research is to generate theory rather than build upon existing models. Approximately 98% (n = 18) of the basic research articles reviewed had unclear or non-existent theoretical frameworks. Surprisingly, 90% (n = 9) of the action research articles and 70% (n = 220) of the applied research articles possessed unclear theoretical frameworks – or indicated no framework at all. The mean number of citations used to establish the conceptual and/or theoretical frameworks was 13.47 (SD = 7.99, Md = 12). (See Table 1.)

Table 3
Extent of Use of Conceptual and Theoretical Frameworks in Qualitative and Quantitative Studies

Degree to Which Established	Quantitative				Qualitative			
	Conceptual Framework		Theoretical Framework		Conceptual Framework		Theoretical Framework	
	f	%	f	%	f	%	f	%
None	4	1.4	143	49.3	5	11.9	25	59.5
Attempted to establish, but result was unclear	28	9.6	55	19.0	5	11.9	9	21.4
Cited and developed appropriate framework	258	89.0	92	31.7	32	76.2	8	19.1
Totals*	290	100	290	100	42	100	42	100

*Does not include studies that used both quantitative and qualitative philosophies.

Researchers cited a limited number of references in establishing conceptual and theoretical frameworks (Table 4). While the number of references cited is not as important as the quality of the cited research base, it is near impossible to develop a quality conceptual framework without an extensive review of literature.

Table 4
Number and Type of References Cited in Journal of Agricultural Education Articles

Number of Citations	All Cited References		Cited Research References	
	f	%	f	%
0 – 5	21	5.9	176	49.4
6 – 10	70	19.7	112	31.5
11 – 15	113	31.7	48	13.5
16 – 20	85	23.9	10	2.8
21 – 25	42	11.8	4	1.1
More than 25	25	7.0	6	1.7

Whereas some articles cited a plethora of references, others were published with very limited numbers of citations. As indicated in Table 4, a combined total of 25% of articles had from 0 –

10 citations. Likewise, the type of references cited contained fewer research-based references than is typical for applied research. Nearly half (49.4%) of the articles contained five or less *research* citations.

The mean number of references cited per article was 15.2 (SD = 7.03), of which the mean number of research citations was 6.27 (SD = 6.9). Displayed graphically in Figure 1, the number of citations listed in the reference section varied from 3 – 51, with a skewed distribution of numbers. The median number of references listed was 14.

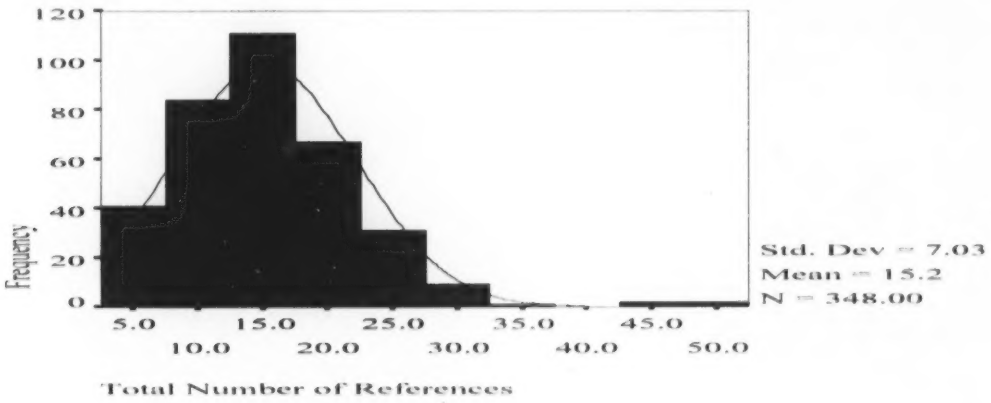

Figure 1. Number of references cited.

Table 5 and Figure 2 each display representations of the number of *research* articles listed in the references of each article. Since over 90% of the articles accepted for publication were applied research, logic would dictate that a vast majority of references listed would be research-based. As indicated below, the mean number of *research* studies that authors cited was 6.9. The median number of research references listed was 6.0. As was the case with the total number of citations, the distribution of the number of research citations was skewed.

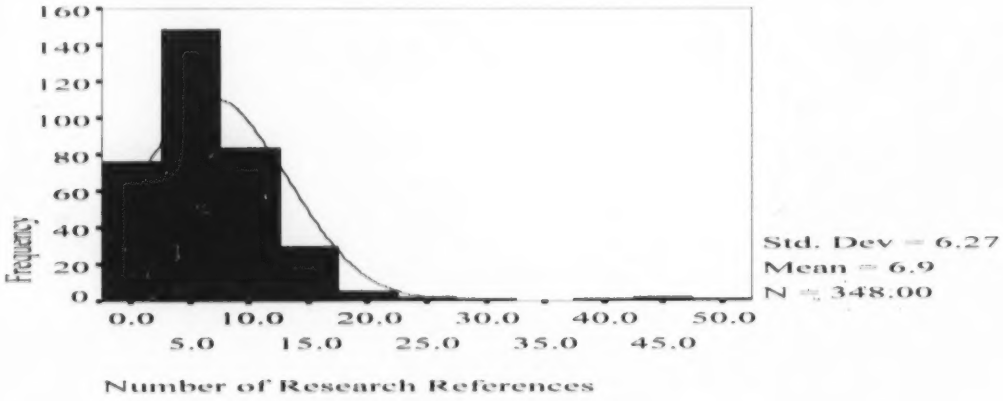

Figure 2. Number of *research* references cited.

Question 3: *To what extent did conclusions address the conceptual and/or theoretical model used (or produce theory if qualitative by philosophy)?*

As presented in Table 1, the mean number of citations found in the conclusions, recommendations, and implications sections of articles was 2.25 (SD = 3.29, Md = 1). Table 5 contains data showing the distribution of citations as they were applied to the existing literature base.

Although over 90% of the articles reviewed were applied research, which should have required that researchers compare their results with those of others, 75.9% of the articles failed to compare the findings with as few as three prior studies that had been cited in the conceptual or theoretical frameworks. Nearly one-half (47.4%) failed to compare results with at least one piece of research cited in the conceptual framework, or to the theoretical framework that supposedly guided the study.

Table 5
Number of Citations in the Conclusions, Recommendations, and/or Implications Sections of Journal of Agricultural Education Articles (N = 348)

	All Cited References	
Number of Citations	f	%
0	165	47.4
1	43	12.4
2	33	9.5
3	23	6.6
4	18	5.2
5	11	3.2
6	14	4.0
7	10	2.9
8	9	2.6
9	4	1.1
10 or more	18	4.0

Question 4: How has the formation and usage of conceptual and theoretical frameworks in agricultural education research changed over the past decade?

The Journal of Agricultural Education published 40 volumes during the ten years that comprised this analysis. To better gauge the changes taking place in the reporting of research in the Journal, the decade was divided into four equal time periods consisting of 10 volumes each. As indicated in Table 6, the first quarter of the decade produced publications in which the highest percentage of articles (94.5%) cited appropriate conceptual frameworks. That percentage had dropped to 78.7% by the end of the decade. Likewise, the percentage of articles in which the researcher cited *some* research, but failed to develop a clear conceptual framework increased from 4.4% in the first quarter of the decade to 20% by the end.

Articles accepted to the Journal exhibited progressively less well-developed conceptual frameworks throughout the decade. In the first quarter of the decade, 94.5% of the published articles cited appropriate conceptual frameworks. That percentage dropped to 86.3% during the second quarter of the decade. By the end of the decade the percentage of published articles with appropriate conceptual frameworks had dropped to 78.7%.

Selection and use of theoretical frameworks improved from the first part of the decade, although the number of studies with appropriate frameworks was still low (33.3%). In the first ten issues of the Journal only 7.7% of all published articles cited appropriate theoretical frameworks. That percentage dramatically increased to 33.3% in the second quarter and to 43.8% in the third quarter of the decade. By the final quarter of the decade, however, the number of articles with appropriate theoretical frameworks had dropped to 33.3%.

Table 6
Degree to Which Conceptual and Theoretical Frameworks Have Been Used and Reported Over Time

	Date of Publication*			
Degree to Which Established	1990-1993	1993-1995	1995-1997	1997-1999
Conceptual Framework				
None	1 (1.1%)	3 (1.1%)	4 (1.1%)	1 (1.1%)
Attempted to establish, but result was unclear	4 (1.1%)	11 (1.1%)	6 (1.1%)	15 (1.1%)
Cited and developed appropriate framework	86 (1.1%)	88 (1.1%)	70 (1.1%)	59 (1.1%)
Theoretical Framework				
None	67 (1.1%)	42 (1.1%)	29 (1.1%)	36 (1.1%)
Attempted to establish, but result was unclear	17 (1.1%)	26 (1.1%)	16 (1.1%)	14 (1.1%)
Cited and developed appropriate framework	7 (1.1%)	34 (1.1%)	35 (1.1%)	25 (1.1%)
Totals	91	102	80	75

*Journal articles are equally divided into four groups of ten volumes each, published in the years indicated.

Conclusions/Implications/Recommendations

Most of the research reported in the Journal of Agricultural Education over the past decade can best be classified as quantitative, applied, and survey research. Of the 348 articles evaluated, over 83% were classified as quantitative research. Based upon purpose, over 90% of the articles were determined to be applied research. When classified by method, over 54% of the articles reviewed used a survey design.

When classified by purpose, research published in the Journal of Agricultural Education was almost entirely applied research. Why? Are reviewers for the Journal more likely to only accept research that builds upon existing theory, or is it that agricultural education researchers conduct little basic or action research? Is action research deemed to be more biased because it is designed to address a problem in which the researcher is intimately involved? Do agricultural educators fail to use research-based solutions when solving their immediate problems, and therefore render those studies unpublishable? Further research directed at determining the attitudes of Journal of Agricultural Education reviewers toward submission criteria and/or research philosophy may be helpful in answering some of these questions. In addition, Journal editors may wish to implement training seminars to assist reviewers in improving skills in critiquing submitted articles.

Researchers may have a limited understanding of the functions of, and differences between, conceptual and theoretical frameworks. Authors in over 87% of the studies analyzed had developed a clear conceptual framework. However, only approximately 20% of the published articles cited an appropriate theoretical framework. Likewise, when theoretical frameworks were cited, often they were not well connected to the research being conducted. Interestingly, both quantitative and qualitative studies often failed at developing sound theoretical frameworks. Approximately 91% of the qualitative studies and over 68% of the published quantitative studies failed to focus the inquiry around theory explanation or development, or exhibited a theoretical framework that was poorly developed. Has the profession heeded the warnings of Buriak and Shinn (1989; 1993), Silva-Guerrero and Sutphin (1990), and Warmbrod (1986)?

Researchers cited a limited number of references in establishing conceptual and theoretical frameworks – both in explanatory citations and in citations of related research. Whereas some articles cited a plethora of references, others were published with a very limited number of citations. Nearly half (49.4%) of the articles contained five or less research citations. Of those that contained more than 25 research citations, all were syntheses of research. While the number and type of references cited does not ensure that a conceptual base has been established, it is difficult to develop a sound framework without an extensive review of the research base. Not only should a greater number of references be utilized, researchers should also focus on developing a quality review of literature. These findings further emphasize the need to improve the rigor of research in agricultural education, as called for by Warmbrod (1986).

Most articles published in the Journal failed to tie conclusions to the conceptual and/or theoretical frameworks around which the research was conducted. Nearly 47% of the articles reviewed failed to compare research findings with even one piece of research cited in the conceptual framework, or to the theoretical framework that supposedly guided the study.

Selection and use of theoretical frameworks improved from the first part of the decade, although the number of studies with appropriate frameworks was still low – around 33%. By contrast, as the decade progressed, articles accepted to the Journal tended to have slightly less well-developed conceptual frameworks. For example, in the first quarter of the decade, nearly 95% of the published articles cited appropriate conceptual frameworks. By the end of the decade

that percentage had dropped to just over 78%. To predict a trend goes beyond the scope of this investigation, but the situation warrants future attention.

As noted by Buriak and Shinn (1989), in order to gain the respect of external decision makers, agricultural education researchers should adopt and use more rigorous research techniques. A decade later this call for rigor is still pertinent.

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